Monitoring & Research Needs to Characterize Algal Blooms and Related Impairments in the Lower James River Estuary

Lower James River Workgroup

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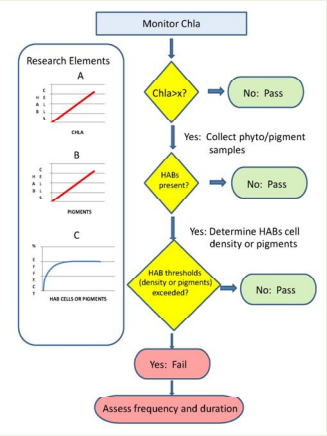
Conceptual model for chlorophyll criteria development and implementation for the lower James River



Needs – Criteria Development and System Status Assessment

- **Objective 1. Characterize algal blooms in the lower James River and evaluating their causes.**
- **Task A1.** What are the temporal and spatial dynamics of algal blooms in the lower James River?
- **Task A2.** What are the relationships between Chl a, diagnostic pigments and HAB cell density?
- **Task A3.** What are the environmental triggers of HAB bloom development and dynamics?

- **Objective 2. Assess impairment associated with algal blooms.**
- **Task B1.** What are the important linkages between HAB cell density and biological impairment?
- **Task B2.** What is an appropriate biological reference curve for system impairment status?

- **Task A1. Determine the temporal and spatial dynamics of algal blooms in the lower James River.**
  - **Add DATAFLOW sampling** in JMSOH to complement intensive spatial JMSPH and JMSMH sampling.
  - **Compliment Dataflow with several fixed continuous monitors** (CONMON) at "hotspots" to monitor current bloom development and impacts.

- **Task A2. Develop relationships between Chl a, diagnostic pigments and HAB cell density.**
  - **Establish relationships** between Chl a metrics and bloom abundance and type using diagnostic pigment and molecular approaches.
  - **Establish chlorophyll thresholds** associated with potential impairments.

- **Task A3. Understand the environmental factors affecting HAB bloom development and dynamics?**
  - **Evaluate the effects of physical factors, storms and other episodic events** on bloom initiation and persistence.
  - **Investigate the potential for top down controls** on bloom persistence and intensity.
  - **Measure and then model the development and spreading of bloom**, to assist in standards development and HAB monitoring and management.

- **Task B1. Determine the important linkages between HAB cell density and biological impairment?**
  - **Develop study plan** to evaluate optimal HAB species, season and other components affecting linkages between HAB density and potential impairments.
  - **Conduct background surveys and new bioassay/dilution toxicity experiments** using native HAB species to develop impairment thresholds.

- **Task B2. Determine an appropriate biological reference curve for system impairment status.**
  - **Use existing data and new research** to develop new biological reference curve.
  - **Utilize new biologically base reference curve** to determine allowable frequency and intensity of bloom events that will not result in system impairment.